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THE PLANT DISEASE SURVEY

DIVISION OF MYCOLOGY AND DISEASE SURVEY

Vol. XIX August 1, 1935 Number 12

QUINCE RUST ON APPLES IN WESTERN ILLINOIS

H. W. Anderson

Deformed apples from western Illinois were received from county advisers and growers during the late spring when the fruit was about a half-inch in diameter. This injury resembled hail damage but those sending in specimens reported no hail. Later, from larger specimens, it was determined that the disease was caused by Gymnosporangium clavipes, the quince rust, as described in the article by Paul R. Miller (Phytopath. 32:723-740, 1932).

A visit to the western Illinois orchards showed that the quince rust was causing far more damage than the ordinary apple rust. As a matter of fact apple rust (G. juniperi-virginianae) was comparatively rare even on the foliage, although weather conditions were favorable for its development this year. Earlier in the spring cedar apples were observed to be very abundant on the cedars in this region and the spore horns were very conspicuous.

The actual damage from the quince rust will not be great, since there is an abundance of fruit and only a few apples on each tree can be found showing the rust lesions.

It was easy to find the typical spindle-shaped swellings caused by the quince rust on cedars.

The following apple varieties were most seriously attacked by quince rust: Winesap, Delicious, Willow Twig, and Jonathan. Winter Banana and Rome Beauty showed some diseased fruits. Ordinary apple rust was found on the same tree with quince rust on the fruit of Jonathan and Rome. No aecia have developed to date. The hawthorn rust (G. globosum) shows an abundance of aecia on all species of Crataegus. On a wild crab apple both apple rust and hawthorn rust were found on the leaves.

The quince rust on apple fruit is easily distinguished from ordinary apple rust by the fact that the injury extends to the core and the typical orange color on the surface is lacking. The apple is decidedly deformed and definite craters resembling hail injury are produced as the apple enlarges. Usually only one lesion occurs on a fruit. (University of Illinois, July 15).

UNUSUAL DEVELOPMENTS OF CEDAR RUSTS ON POMACEOUS HOSTS IN 1935.

Ivan H. Crowell

The protracted dry spring of 1935 in Massachusetts has given rise to certain unusual phenomena with respect to the abundance and development of cedar rusts on pomaceous hosts. The first spring rain in which basidiospores of cedar rust fungi were disseminated occurred on April 13. This rain was prior to the opening of buds of pomaceous hosts and essentially no infection occurred. In the following three to four weeks no rain fell in sufficient quantity to cause germination of teliospores. During these rainless weeks flower and foliage development of most pomaceous hosts proceeded rapidly. The flowers had opened completely and many species had dropped their petals. The foliage of most species was almost fully expanded.

It has been shown that after these stages of development are reached, practically no infection occurs by such fruit infecting species as Gymnosporangium clavipes, G. nidus-avis, and G. clavariaeforme (Crowell, unpublished data). The protecting influences of the short period of susceptibility of the host fruits to these species of cedar rusts was remarkable. Ninety-eight per cent of the fruits of certain experimental plants of Amelanchier oblongifolia were infected with G. clavipes in 1934, while these same bushes had less than one quarter per cent of their fruits infected in the unusually dry spring of 1935.

Foliage-infecting species such as G. juniperi-virginianae on Malus, G. globosum on Crataegus, G. clavariaeforme on Amelanchier, G. biseptatum on Aronia manifested similar phenomena. Foliage for most hosts for these rust species had not burst from the buds at the time of first basidiospore dissemination and thus did not become infected. A good deal of the foliage of the more resistant species of Malus, Crataegus, and Amelanchier had passed its period of susceptibility at the time of the second basidiospore dissemination and thus

escaped infection, while foliage that was still within the period of susceptibility was becoming more resistant, and the rust developed more slowly than usual. During the past three years aeciospores of G. juniperi-virginianae have reached maturity by July 1. In 1935 aeciospores of all species are three to four weeks later than usual in maturing.

This year, due to the unusual coincidence of rainless periods with the development of new growth of host plants, many experimental hosts entirely escaped rust infection while on other hosts recorded infections were fewer than in past years and the rust much later than usual in reaching maturity. (Consulting Pathologist, July 24.)

OTHER REPORTS ON RUST (GYMNOSPORANGIUM SPP.) ON APPLE

MASSACHUSETTS: The outstanding feature about cedar rust on apples this year is its delayed start. There was very little gelatinization of cedar-apples until after the blossom period of apples, in fact not until after the rains of May 31 and June 4. Hence, with the pre-blossom sprays and the calyx spray on before rust spores were released from the gelatinous spore-horns, there perhaps should be less infection and damage than in the average season on susceptible commercial varieties that ordinarily receive at least the pink and petal-fall applications, including Wealthy. As a rule, the first prominent gelatinization of cedar galls and infection of apples, crabapples, and hawthornes, occurs during the pre-pink, pink, or the early blossom stage. Due to the heavy outbreak of rust on apples two years ago, there is a heavy crop of mature galls on cedars this year, and we should expect pronounced infections of unsprayed, susceptible pome trees this summer.

Wilbur Thies reports a great deal of a peculiar chlorotic spotting of McIntosh and other varieties that are not ordinarily subject to cedar rust injury. I have observed the same condition on McIntosh in some Valley orchards, and noticed it on both Baldwin and McIntosh last year. In fact, the condition is present every year to some extent. The spots are merely yellowish-green or light green areas from 1/8 to 1/4 inch in diameter, usually with a tiny brown speck in the center. In more advanced stages, there may be a distinctly yellowish or orange area in the center of the lesion. All such spots occur only on the upper surface of the leaves. The cause is cedar rust infection which is able to progress no further on the resistant varieties. In the case of Wealthy, Winter Banana, etc., the spots continue to develop until the large, characteristic lesion is produced with the spore-containing cluster-cups on the under surface. (O. C. Boyd, July 17.)

VIRGINIA: Rust has been very severe in regions where cedar trees are present. (S. A. Wingard, July 25).

SCAB LESIONS ON WOOD OF APPLE TREES IN INDIANA

Infection of the wood of apple trees by the scab fungus (Venturia inaequalis) as reported by Leslie Pierce of the Division of Fruit and Vegetable Crops and Diseases is said to be an unusual occurrence in the Middle West.

> "Apple scab is present on the water sprouts and new growth of all the unsprayed check trees in our experimental orchard at Vincennes, Indiana. Although the infection is much more severe on the wood of Winesap than on that of the other varieties in the orchard, numerous lesions are showing on the new growth of unsprayed Grimes, Turley, Delicious, and Stayman. Except that they are slightly smaller in size, the lesions on young apple wood have much the same appearance as scab infection on leaf petioles and fruit pedicels. Scab on young apple wood was first observed in this general section on Winesap in a neglected orchard at Henderson, Kentucky, on May 16, 1933."

VARIOUS REPORTS ON APPLE SCAB

MASSACHUSETTS: The first new infection showed up as usual during late bloom, around May 24, just shortly before and during the time the petal-fall spray went on. These infections no doubt resulted from the rains of May 3 to 4 or 6 to 7 during the pre-pink bud stage. Scab resulting from the rainy period of May 9 to 10 during the pink stage appeared a few days later. At present scab is causing considerable concern in orchards that were not properly (timely or thoroughly) protected before blossom, especially where a wettable sulfur spray was used at petal-fall instead of the recommended lime-sulfur. In some instances, cover sprays of lime-sulfur had to be resorted to for burning out leaf infections. (O. C. Boyd, July 17).

PENNSYLVANIA: In an experimental orchard at State College, July 22, check trees were very severely scabbed on both fruit and foliage, while the disease was almost perfectly controlled and frequently entirely absent on trees sprayed with lime-sulfur and various modifications. In Westmoreland County, July 23, scab was very severe on unsprayed trees everywhere and almost or even equally bad in some orchards sprayed, in one case five times, and in another twice. The orchards afford a good demonstration of the necessity of timely applications. (H. A. Edson).

VIRGINIA: Scab has been unusually hard to control this season. Unsprayed or poorly sprayed orchards show a very heavy infection, both on foliage and fruit, and there is considerable scab even in many of the best cared-for orchards, due to the fact that there was so much rain that it was impossible to apply the sprays at the proper time. Much of the scab infection is still active and there is considerable danger of late development during August if the rainy weather continues. (S. A. Wingard, July 25).

WISCONSIN: There is more scab than usual. Infection is very severe on unsprayed or poorly sprayed trees. (R. E. Vaughan, July 12).

BLIGHT ON PEAR AND APPLE

MASSACHUSETTS: Reports indicate about the normal amount of blight (Bacillus amylovorus) in apple orchards. There appears to be somewhat less injury to Baldwin and Rhode Island Greening in the Valley orchards than in 1934. Fall Pippins, however, show as much twig blight as, and perhaps more blossom and spur blight than last year. (O. C. Boyd, July 17).

PENNSYLVANIA: Blight was observed frequently on pear trees in the vicinity of State College and in Westmoreland County. It was seen also on apples, but much less frequently. (H. A. Edson, July 22 and 23).

MARYLAND: En route from Frederick to Hagerstown pear trees in home orchards were generally and sometimes severely blighted. Twig blight was severe in some cases where there had been no blossom blight to prevent fruit setting. Limbs were often killed back two feet from the tips. (H. A. Edson, July 21).

VIRGINIA: Blight was rather late in developing but it caused considerable twig injury in some apple orchards. (S. A. Wingard, July 25).

WISCONSIN: Blight is prevalent on apples in southern and western Wisconsin, but is not as bad as in some years. Twig blight symptoms are most evident, and there is little if any blossom blight. (R. E. Vaughan, July 12).

FRUIT DISEASES IN THE HOOD RIVER VALLEY OF OREGON

J. R. Kienholz sent specimens of peach and nectarine affected by powdery mildew (Sphaerotheca pannosa). He wrote (June 10) "It would appear that the nectarine mildew might be a noteworthy report. The trees are interplanted in the moderately infected peach orchard, but only occasional fruits and spurs are affected." The Survey has no other record of the occurrence of powdery mildew on nectarine.

He reported also that leaf curl (Exoascus deformans) and California blight (Coryneum beijerinckii) were causing more damage to peaches than usual, mostly because of lack of spraying. There was much less pear scab (Venturia pyrina) than last year in the Valley as a whole.

REPORTS ON DISEASES OF PLUM AND CHERRY

POWDERY MILDEW AND LEAF SPOT ON SOUR CHERRY IN PENNSYLVANIA: Powdery mildew (Podosphaera oxyacanthae) was universal on old and young trees and suckers in a neglected roadside thicket near Smithton, July 23. Leaf spot (Coccomyces hiemalis) was also abundant. (H. A. Edson, note accompanying specimens).

BLACK KNOT IN VIRGINIA: Several specimens of black knot (Plowrightia morbosa) on plum and cherry have been sent in. This disease is causing considerable damage in some places. (S. A. Wingard, July 25).

DISEASES IN WISCONSIN: Pockets (Exoascus pruni) is reported extensively on wild plums in central and northern Wisconsin, and has been noted on wild cherry in Door and Ashland Counties.

Brown rot (Sclerotinia fructicola) is rather prevalent on wild plums and wild cherries.

Leaf spot (bacterial?) has developed recently on a number of plum trees in the vicinity of Madison.

Leaf spot (Coccomyces hiemalis) is becoming abundant on unsprayed cherry trees in commercial orchards. Well sprayed trees are holding their leaves very well. (R. E. Vaughan, July 12).

DISEASES AND WINTER INJURY ON RASPBERRY

CANE BLIGHT IN VIRGINIA AND OHIO: S. A. Wingard reported that cane blight (Leptosphaeria coniothyrium) is the most prevalent and destructive disease of raspberries in Virginia, so much so that it is difficult to find raspberry plantings not injured by it (July 25).

E. W. Mendenhall sent specimens from Galena, Ohio, reporting that the entire plantation of two and one-half acres of Cumberland raspberries was infected with cane blight (June 27).

ANTHRACNOSE IN VIRGINIA: Anthracnose (Elsinoe veneta) is rather common but it does not seem to be doing so much damage as cane blight (S. A. Wingard, July 25).

WINTER INJURY IN PENNSYLVANIA AND WISCONSIN: One-year-old bushes in one well cared-for planting in Pennsylvania were going down rapidly from what appeared to be collar injury due to winter freezing. The trouble is said to be very common in the State. The bases of the stems were a peculiar bluish color externally and showed necrotic pith on cutting open. Wilting of the new growth at the tips of the canes was the most conspicuous sign of impending death. (H. A. Edson, July 23).

In Wisconsin, several specimens have been sent in showing small leaves started and then withered. The canes are all brown inside. (R. E. Vaughan, July 12).

OTHER REPORTS ON FRUIT DISEASES

FROG-EYE LEAF SPOT OF APPLE IN VIRGINIA AND SOUTH CAROLINA: This leaf spot (Physalospora obtusa=Sphaeropsis malorum) has been unusually severe in many orchards in Virginia. (S. A. Wingard, July 25.

W. C. Nettles sent specimens from Clemson College, South Carolina, of a leaf spot which he said had been defoliating many trees. According to J. A. Stevenson, the initial cause was presumably Sphaeropsis malorum, although no spores were found. The spots were overgrown by Coniothyrium, probably C. pirinum, and a species of Cladosporium.

PEACH DISEASES IN VIRGINIA: Leaf curl (Exoascus deformans) was unusually severe throughout the State this spring but it was readily controlled by spraying with either Bordeaux mixture or lime-sulfur.

The twig and blossom blight stages of brown rot (Sclerotinia fructicola) were more severe than usual in many orchards, and brown rot has been very prevalent on the fruit of early varieties. (S. A. Wingard, July 25).

LEAF BLIGHT OF QUINCE IN PENNSYLVANIA: H. A. Edson sent specimens of the leaf blight (Fabraea maculata)from Smithton, July 23. He said the disease was general throughout a neglected orchard.

BLACK ROT OF GRAPE IN VIRGINIA: Black rot (Guignardia bidwellii) apparently is causing considerable damage this season. Many specimens have been sent in and growers state that they are having difficulty in controlling the disease with Bordeaux mixture. (S. A. Wingard, July 25).

SOME REPORTS ON POTATO DISEASES

BLACKLEG IN VIRGINIA AND NORTH DAKOTA: Potato blackleg (Bacillus phytophthorus) is more general and more destructive than I have ever known it to be in Virginia. The seed potatoes in most cases were northern grown, and the disease appeared to be seedborne. (S. A. Wingard, July 25).

Near Bismarck, North Dakota, two acres of potatoes showed about 10 per cent of the plants dying with blackleg. (P. A. Young, July 8).

LEAF ROLL IN PENNSYLVANIA: A high percentage of leaf roll was noted in one field in Westmoreland County but no counts were made. (H. A. Edson, July 23).

PSYLLID YELLOWS IN NEW MEXICO: Psyllid yellows is one of the most important diseases attacking potatoes in New Mexico, and was especially severe this season. (R. F. Crawford, July 22).

DISEASES OF TOMATO

BACTERIAL CANKER IN VIRGINIA AND TEXAS: Bacterial canker (Aplanobacter michiganense) has appeared in severe form in tomato fields in Montgomery, Floyd, and Bedford Counties, Virginia. In some fields from 50 to 75 per cent of the plants are affected. We are not absolutely certain that this is bacterial canker but the symptoms indicate that it is. The disease is appearing in fields where tomatoes had never been planted before and in some cases on newly cleared land. The plantbeds were also located on new ground, indicating that the infection must be seed-borne. (S. A. Wingard, July 25).

Bacterial canker caused considerable damage to tomatoes in eastern Texas. The outbreak was sporadic and in the same section the disease was prevalent on one farm and absent from adjoining ones. This is probably due to seed-borne infection (J. J. Taubenhaus, June).

OTHER DISEASES IN VIRGINIA: Stem canker or collar blight (Alternaria sp.) appeared in epiphytotic form both in tomato plantbeds and in the field. In many cases the plants were completely girdled just above the ground line. Fusarium wilt (F. lycopersici) and southern bacterial wilt (Bacterium solanacearum) have also been reported. (S. A. Wingard, July 25).

EARLY BLIGHT AND BACTERIAL SPOT IN TENNESSEE: Specimens of these diseases, caused by Alternaria solani and Bacterium vesicatorium, respectively, were collected by E. M. Prather at Manchester, Coffee County, July 9. The organisms were determined by S. P. Doolittle

VARIOUS REPORTS ON DISEASES OF VEGETABLES

WILT OF SWEET POTATO IN VIRGINIA: Fusarium wilt of sweet potato has been reported from one field in Richmond County. (S. A. Wingard, July 25).

BACTERIAL BLIGHT OF BEAN IN MASSACHUSETTS: Bacterial blight has been present for some time, and is causing considerable leaf damage and pod spotting in some fields. Last week, I observed a uniform, heavy infection in a large planting of French Horticultural, while an adjacent planting of wax snap beans showed only a trace. The shell beans were planted from seed that was saved on the same farm last year and from a field that was prominently infected with blight. (O. C. Boyd, July 17).

HALO BLIGHT OF BEANS IN NORTH DAKOTA: P. A. Young sent in specimens of Kidney Wax bean affected by halo blight (Bacterium medicaginis phaseolicola), from Mandan, North Dakota, July 17. He reported that many plants of several varieties were affected. In parts of rows all of the plants were killed.

DISEASES OF GARDEN BEANS IN VIRGINIA: There seem to be unusual amounts of bacterial blights, mosaic, and Fusarium root rot in bean plantings this season. (S. A. Wingard, July 25).

CLUB ROOT ON CABBAGE IN VIRGINIA: Club root (Plasmodiophora brassicae) in severe form was reported from one home garden in Grayson County. The soil in this garden was found to be very acid in reaction. (S. A. Wingard, July 25).

MAGNESIUM HUNGER IN MASSACHUSETTS: It seems that this soil deficiency trouble is more noticeable than in the average year, judging from the few trips I have made recently in the Valley. Sweet corn was badly damaged on some farms, and beans, cucumbers, and carrots were noticeably affected. In some instances, the growers admitted that the soils were perhaps too sour, but did not recognize the magnesium-hunger symptoms. (O. C. Boyd, July 17).

CURRENT REPORTS ON BACTERIAL WILT OF CORN

MASSACHUSETTS: I observed bacterial wilt (Aplanobacter stewarti) on sweet corn in two fields in Westfield and one field in West Springfield on July 8. There were a few scattered plants showing primary infection, with light secondary spread in each field. The primary infections had been in evidence for at least five or six days. There were signs of heavy thrip and light flea beetle feeding. (O. C. Boyd, July 17).

VIRGINIA: Bacterial wilt of sweet corn practically destroyed all of the Golden Bantam plantings in many home gardens. The disease seemed to be very common this year. (S. A. Wingard, July 25).

TEXAS: Bacterial blight was first noticed about May 1 in a 50-acre patch of a South American variety of popcorn. It spread rapidly during a cloudy period with excessive rains and finally involved nearly 30 per cent of the stand. With the advent of dry weather its spread was checked and present indications are that the yield of the diseased plants will not be affected. The seed was grown about 70 miles north of Kansas City, Missouri. (J. J. Taubenhaus).

INCIDENCE OF BACTERIAL WILT IN EXPERIMENTAL PLANTINGS OF SWEET CORN AT LAFAYETTE, INDIANA, in 1934[1/]

By Glen M. Smith
Assistant Pathologist, Division of Cereal Crops and Diseases,
Bureau of Plant Industry, United States Department of Agriculture.

During the season of 1934 field trials were conducted with 100 open pollinated varieties and strains of early sweet corn. Duplicate plantings were made on two different soil types which also had been subjected to different cropping systems. One planting was made on

1/ Cooperative investigations between the Division of Cereal Crops and Diseases, Bureau of Plant Industry, United States Department of Agriculture and Purdue University Agricultural Experiment Station.

May 24 in the Horticultural Gardens west of the University on a sandy loam soil with a gravelly subsoil. This field had been used previously for vegetable crops and had not been planted to corn for several seasons. Four days later, May 28, the same strains were planted in a low lying field seven miles north of LaFayette. The soil in this field is a silt loam with a moderately heavy subsoil. This field has grown corn continuously for the past thirteen years. In previous seasons there has been relatively less bacterial wilt in the sweet corn in this field than in any of the other plantings.

A summary of the results from these two plantings is given in table 9. The column headed "Days to Silk" indicates the period from the date of planting until the strain comes into silking and thus serves as an index of the relative earliness of the various strains. The planting in the Horticultural Gardens is designated as "Field I" and that seven miles north of LaFayette as "Field II".

Losses due to wilt in Field I were practically negligible in most cases. Only five strains showed more than 10 per cent infection and 69 strains suffered no loss. Three of the strains showing the higher percentages of damage were of the Golden Early Market variety, one of the most susceptible types. The other two strains which had more than 10 per cent loss were in the Early Crosby variety. This variety exhibited a high degree of susceptibility in field plantings in this section and had the highest percentage loss in Field II.

In Field II the losses due to wilt ranged from 1.5 per cent in one strain of Black Mexican, a relatively resistant variety, to 63.3 per cent in one of the strains of Early Crosby.

The average number of days to silking and the average percentages of plants killed by wilt for the varieties represented by more than one sample are summarized in Table 10 and Fig. 49. Although the spread in date of silking is not so great as would have been obtained if later varieties had been included, the interval between the average date of silking of the earliest and the latest varieties was fifteen days. There were several cases wherein the average percentage loss was not in accord with the accepted idea that the earlier types are more susceptible and the later varieties more resistant to infection. Early Crosby, one of the latest in the trials, had the highest average loss while Spanish Gold, one of the earliest, had a very low percentage loss. In general, there is a very slight trend toward lower percentages of infection in the later types.

The average loss due to wilt for the state as a whole would probably not exceed 5 per cent. The average for Field II was 15 per cent, approximately three times as great as the average for the State.

Table 9. Occurrence of bacterial wilt in field trials, LaFayette, Indiana, 1934.

Variety	Source	Days to silk	Percentage of Plants killed by wilt in Field I	Percentage of Plants killed by wilt in Field II
Early Crosby	Asgro (Idaho "A") 1/	53	11.1	55.0
	(Conn. "A") 2/	53	0	63.3
	(Idaho "B")	56	10.5	57.1
	Landreth	57	0	26.7
Golden Gem	Harris	44	2.9	41.5
	Vaughan	44	6.9	38.0
Golden Hummer	Leonard	44	4.0	19.4
Carmel Golden	Ferry-Morse	50	0	7.0
Extra Early Yellow	Woodruff, F. H.	44	0	29.9
Early Golden Sweet	Vaughan	45	2.6	25.4
Spanish Gold	Asgro (Conn. "A")	44	0	4.2
	(Idaho "A")	44	0	11.1
	Livermore	44	0	1.8
	Woodruff, F. H.	45	0	7.1
Golden 60-Day	Vaughan	44	2.9	14.1
Golden Early Market	Asgro (Conn. "A")	44	10.0	11.4
	(Conn. "B")	45	5.6	13.3
	(Idaho "A")	44	3.0	15.0
	(Idaho "B")	44	3.0	24.3
	Burpee	46	9.4	16.6
	Crookham	45	11.1	16.0
	Harris	44	12.1	18.4
	Woodruff	44	8.0	9.1
Golden Sunshine	Burpee	49	2.8	8.2
	Ferry	47	0	3.1
	Harris	50	2.7	18.1
	Henderson	48	0	21.2
	Landreth	57	0	4.4
	Leonard	50	9.1	15.4
	Livingston	48	0	17.4
	Woodruff	45	5.3	16.2
Gold Coin	Burpee	52	5.3	10.4
Charlevoix	Ferry	52	0	4.7
Extra Early Bantam	Harris	45	2.5	8.8
Golden Bantam	Asgro. 8-row (Conn. "A")	48	0	5.4
	(Conn. "B")	47	0	9.3
	(Conn. "C")	49	2.9	14.3
	(Idaho "A")	50	0	12.2
	(Idaho "B")	49	0	14.3
	(Idaho "C")	49	0	24.3
	(Idaho "D")	50	0	17.8
	10-14 row (Conn. "D")	53	2.6	13.5
	(Conn. "E")	53	0	10.9
	(Conn. "F")	53	0	15.8
	(Idaho "E")	54	3.3	18.8
	(Idaho "F")	53	2.8	23.3
	(Idaho "G")	52	2.9	8.4
	Burpee	54	0	21.6

1/ Seed produced in Idaho. 2/ Seed produced in Connecticut.

Variety	Source	Days to silk	Percentage of Plants killed by wilt in Field I	Field II
Golden Bantam	Crookham (Strain "A")	51	0	26.8
	(Strain "B")	52	0	39.4
	(Strain "C")	49	0	43.2
	Ferry	49	0	53.5
	Harris	50	2.5	27.4
	Landreth	51	0	7.4
	Leonard	53	0	20.3
	Le Sueur	51	0	18.4
	Livingston	51	0	10.1
	Midwest	52	0	13.8
	Vaughan	48	0	25.9
	Woodruff, F. H.	49	0	16.2
	-Improved-Woodruff, F. H.	54	0	24.3
Burbank Bantam	Burpee	52	0	10.7
Barden Wonder Bantam	Livingston	54	0	7.2
	Leonard	53	2.7	4.4
Golden Rod	Henderson	56	0	5.7
	Woodruff, F. H.	56	0	13.1
Golden Giant	Burpee	56	2.7	16.9
	Crookham	54	0	7.6
	Harris	55	0	4.8
	Landreth	56	2.9	14.7
	Leonard	54	0	22.2
	Woodruff, F. H.	58	0	6.7
Whipple Yellow	Asgro. (Conn.)	56	0	11.4
	(Idaho)	53	0	17.0
	Burpee	56	0	11.7
	Ferry	55	0	9.0
	Harris	55	0	13.0
	Landreth	54	0	9.2
	Leonard	54	0	7.4
	Livingston	56	0	4.7
	Vaughan	54	0	8.5
	Woodruff	52	0	4.3
Bantam Evergreen	Asgro. (Conn.)	60	0	3.8
	(Idaho)	61	0	3.3
	Burpee	61	0	4.0
	Ferry	59	0	6.8
	Harris	56	0	7.8
	Landreth	59	0	7.0
Bantam Evergreen	Leonard	57	0	13.3
	Livingston	59	0	5.2
	Vaughan	57	0	10.0
Black Mexican	Asgro. (Conn.)	54	0	1.5
	(Idaho)	56	0	2.8
	Burpee	56	0	4.3
	Ferry	52	4.2	4.8
	Henderson	57	0	4.9
	Landreth	52	0	4.1
	Leonard	58	0	3.7
	Vaughan	53	0	6.0
	Woodruff, F. H.	54	0	6.1
Average			1.6	15.0

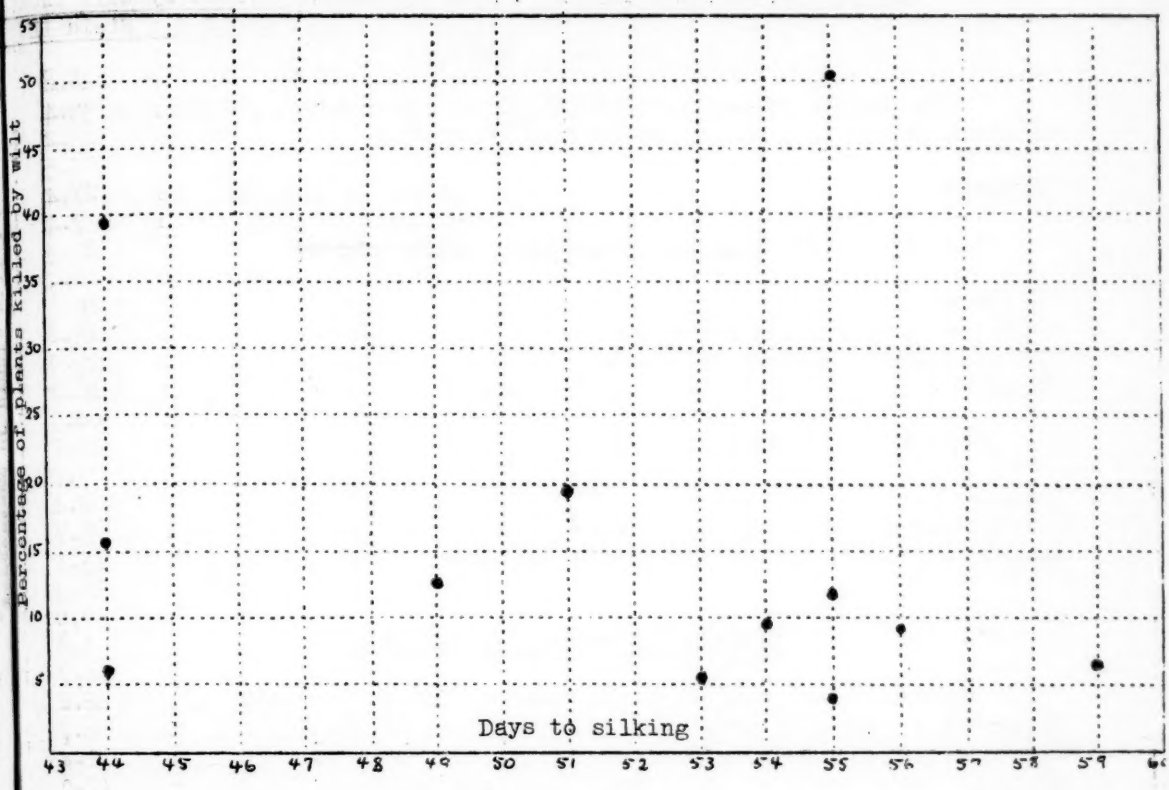

Fig. 49. Relation of silking date to wilt damage.

Table 10. Showing the average percentage loss by varieties due to natural infection with bacterial wilt in Field B 1934.

Variety	Number of strains	Average days to silk	Average percentage of plants killed by wilt
Early Crosby	4	55	50.5
Golden Gem	2	44	39.7
Golden Bantam	27	51	19.8
Golden Early Market	8	44	15.5
Golden Sunshine	8	49	13.0
Golden Giant	6	55	12.1
Whipple Yellow	10	54	9.6
Golden Rod	2	56	9.4
Bantam Evergreen	9	59	6.8
Spanish Gold	4	44	6.0
Barden Wonder Bantam	2	53	5.8
Black Mexican	9	55	4.2

RESULTS OF OAT SMUT CONTROL DEMONSTRATIONS IN PENNSYLVANIA

G. L. Zundel

The results of oat seed treatment for the control of smuts in Westmoreland County in 1935 are as follows (July 23):

Treatment	Number of smutted panicles in 1000 heads counted	Percentage of smut
Farm No. 1, Mt. Pleasant Township:		
Untreated	179	17.9
3 oz. red copper oxide per bushel	132	13.2
1/2 oz. organic mercury per bushel	1	0.1
Formalin 1 pint + 1 pint water to 50 bushels	11	1.1
Farm No. 2, Smithton Township:		
Untreated	58	5.8
1/2 oz. organic mercury per bushel	3	0.3
Formalin 1 pint + 1 pint water to 50 bushels	5	0.5

DISEASES OF CEREALS IN VIRGINIA

Messrs. R. W. Leukel, A. G. Johnson, and W. J. Sando, on June 18, inspected a number of wheat fields in Fairfax, Prince William, Fauquier, Culpeper, and Orange Counties. Abundant leaf rust (Puccinia rubigo-vera tritici) and a trace of loose smut (Ustilago tritici) were found in all fields inspected. Stinking smut (Tilletia sp.) and stem rust (P. graminis) were found in but a few fields; only light infections appeared.

Only traces of scab infections were found on wheat, even though abundant perithecia of the scab fungus (Gibberella saubinetii) occurred on the old corn stalks. Apparently the cool weather in May and June kept down scab infections.

The wheat nematode (Anguillulina tritici) was found in two fields, a trace in one and about 15 per cent in the other. The latter field was near Manassas. (Cereal Courier 27: 63. July 10).

The nematode disease developed in two fields of wheat, one in Montgomery and one in Botetourt County.

Leaf rusts of wheat, barley (Puccinia anomala), and oats (P. coronata) were severe. In some cases the yield of wheat was considerably reduced. The County Agent of Halifax County said that he was certain that leaf rust reduced the wheat yield from 30 bushels to the acre to 6 or 8 in a number of cases. He said it was noticeably worse in good wheat.

Spot blotch (Helminthosporium sativum) and mildew (Erysiphe graminis) were rather common on barley. (S. A. Wingard, July 25).

CEREAL DISEASES IN KANSAS

C. O. Johnston

In the Southern Plains area weather conditions in May and June, 1935, were almost the exact opposite of those for the same months in 1934. Beginning on May 9 at Manhattan heavy rains fell at intervals of a few days throughout the remainder of May and all of June. The total rainfall for the two months was 7.42 inches and 6.79 inches respectively, 3.13 and 2.33 inches above normal for those months. Rain fell on 19 days in May and 20 days in June. The rains were accompanied by disastrous floods in late May and early June and on June 4 the city of Manhattan was badly flooded by the Kaw river. For the first time on record all of the major rivers in Kansas were out of their banks at one time during early June. As would be expected, the heavy rains were accompanied by temperatures considerably below normal.

Although cereal rusts were late in getting a start, owing to early spring drought and subnormal temperatures, they developed rapidly during June. Leaf rust (Puccinia rubigo-vera tritici) of wheat was very severe throughout the Plains area and the eastern half of the states of Texas, Oklahoma, Kansas, and Nebraska were visited by an extremely severe stem rust (P. graminis) infection. Even the hard red winter wheat varieties that are normally lightly attacked by stem rust were heavily infected, although maximum infection on them occurred too late for uniformly heavy losses. The soft red winter wheats probably were rather severely injured by the combined attacks of leaf and stem rust. Kawvale, a variety recently distributed in eastern Kansas, showed high resistance to leaf rust and low stem rust infections. The latter fact may have been partly due to the early maturity of the variety, however.

In the cereal rust nursery at Manhattan, no high resistance to stem rust was noted among winter wheats except in certain Hope hybrids. Selections of Hope×Mediterranean made by Dr. P. C. Manglsdorf of the Texas Station were particularly promising in that respect. Among spring wheats nearly all common varieties were heavily rusted. Ceres had a disappointingly heavy infection, but Marquillo showed greater resistance. Certain durums such as Spelmar, Iumillo, and Kubanka 75 were severely rusted, while Pentad and Mindum were resistant. Spring wheat hybrids from several sources showed promising resistance. This was particularly true of those hybrid lines involving Hope or H-44 parentage.

Wheat stem rust inoculum continued to pile up in nearly all parts of Kansas during June, and early in July alarming amounts of rust were reported on late hard red winter wheat in the extreme northwestern part of the State. This is the first time complaints of stem rust damage have come from that section since 1923.

Both crown rust (P. coronata) and stem rust were very heavy on oats in the vicinity of Manhattan. Crown rust infection was heavy throughout the eastern half of the state and many promising fields were practically destroyed by it. At Manhattan heavy stem rust infection followed crown rust after a few days and ruined many crown rust selections growing in the nursery.

Other cereal diseases were favored in their development by the wet weather of May and June. Speckled leaf blotch (Septoria tritici) was prevalent on winter wheat throughout Kansas, while blackchaff (Bacterium translucens undulosum) and glume blotch (S. nodorum) caused serious damage in certain localities of the south-central and eastern parts of the state. Considerable scab (Gibberella saubinetii) was seen in some wheat fields in northeastern Kansas on June 24 and basal glume rot (B. atrofaciens) also was fairly abundant. Halo blight (B. coronafaciens) and blade blight were abundant on oats in experimental sowings at Manhattan and smut infection (Ustilago spp.) was very heavy in some fields in the northeastern part of the State.

Harvest which began on June 9 in 1934 did not start until the last week in June this year. The winter wheats in the rust nursery were harvested during the period of June 28 to July 2. Harvest is now practically finished and threshing will start within a few days. (Cereal Courier 27: 69-70. July 10, 1935).

THE STEM RUST SITUATION

(The following reports are used through the courtesy of the Bureau of Entomology and Plant Quarantine)

The rust situation during the past week has grown steadily worse. The very high temperatures caused premature ripening of much wheat when it was still in the early to medium dough. It is my opinion that the weather from now on will have relatively little effect on the final outcome except perhaps in the northern and western limits of the spring wheat area. As far north as Fargo there are many fields of Marquis and some of Ceres which are not worth cutting. The situation can best be summarized by stating that an estimate of 50 per cent damage for the spring wheat region as a whole probably is conservative. The rust damage has been intensified and in many cases confused with heat damage. Had there been no rust, heat would have caused considerable shrinkage. Since there was rust, however, the combination of rust and heat has brought about virtual destruction of a considerable percentage of the fields. In some areas, of course, such as the Huron area in South Dakota, heat probably caused more damage than rust. Leaf rust and scab also caused considerable loss.

Oats continues to be relatively free from rust and there will not be appreciable damage from stem rust except in late fields, lodged fields, or very low-lying fields. For the most part, barley is escaping, although there is appreciable loss in late and low fields. Rye, of course, has escaped without damage.

Harvest is under way, or will be within a day or two, as far north as Fargo. (E. C. Stakman, July 27).

In the southern half of Minnesota the damage to individual fields at, or just before, harvest ranged from 30 to 100 per cent. On the sand land where the grain had been sown early there were a considerable number of fields in which the shrinkage did not exceed 30 per cent. In other early fields it ranged from 40 to 60 per cent, while in late fields, low-lying fields, and fields in which the stand was too dense, the damage often was virtually 100 per cent, that is, there would be no milling wheat. This situation prevails, with minor modifications, as far north as the international boundary. (Based on observations by E. C. Stakman at harvest time).

In northwestern Minnesota, along the route from Morris to Crookston, to Fargo, N. Dak., Fergus Falls, and St. Cloud, all fields of Marquis and Ceres had about 90 or 100 per cent infection of stem rust. It appeared that Marquis would not be worth cutting. The damage to Ceres probably would be 40 to 90 per cent in different fields, averaging perhaps 70 per cent, and it is questionable whether much of it is worth cutting. However, between Ada and Crookston, should the weather turn cool, the damage to Ceres may be cut down. Thatcher wheat was free from rust, and it appeared that Marquillo, with an infection of 5-15 per cent, would not be injured by rust. Oats also apparently would not be damaged. Damage to barley, however, may be considerable in some fields; the infection ranged from 20 to 70 per cent in different fields, averaging about 40 per cent. Barley and oats were being harvested as far north as Ada, and some wheat as far north as Fargo. (Based on observations by J. J. Christensen on July 24-26).

STEM RUST ON WHEAT IN NEW MEXICO

Black stem rust of wheat is more severe this year than usual. One of our County Extension Agents reports that "Wheat rust is very bad this year. A cloud of rust spores follows the binder." (R. F. Crawford, July 22).

LOSSES IN FIBER FLAX IN OREGON

The acreage of fiber flax in the Willamette Valley of Oregon is occasionally infected with rust (Melampsora lini) but the losses have not been great. Rust was present in 1930, 1931, and 1934. No rust has been present in 1932, 1933, and 1935. In 1935, however, considerable damage in flax fields has been caused by sun burning. Due undoubtedly to very hot dry weather in early June as many as 50 per cent of the plants in some fields have had the growing point killed and have been burned back at the top one to three inches. The lower part of the stem has remained green and continued to live. The damage has resulted in the entire loss of seed yield of such plants and a loss of

fiber as the plants in most cases had only reached a height of 10 to 20 inches when burned. The damage has been more severe on upland soils in contrast with river bottoms and has been present in five varieties grown commercially in 1935. (B. B. Robinson, Division of Fiber Plants, July 13).

MISCELLANEOUS REPORTS ON DISEASES OF CEREALS AND GRASSES

TAKE-ALL ON WHEAT IN TENNESSEE: Specimens of wheat take-all caused by Ophiobolus graminis Sacc. were collected by Paul R. Miller, June 8. The determination of the fungus was verified by A. G. Johnson.

BROWN SPOT ON CORN IN ALABAMA: A specimen collected by E. E. Hale at Bay Minette, June 17, was determined by A. G. Johnson as brown spot due to Physoderma zeae-maydis Shaw.

LEAF SPOT OF SMOOTH BROME IN NORTH DAKOTA: Samples were collected by Paul A. Young in a field of about 2000 acres of Bromus inermis near the Missouri River at Bismarck on July 4. He noticed the disease in only one small area in the field, but considered it to be potentially serious. The fungus was determined by J. A. Stevenson as Septoria bromigena Sacc.

STRIPE SMUT OF REED CANARYGRASS IN NORTH DAKOTA: Ustilago echinata Shroet. was determined by J. A. Stevenson as the cause of a stripe smut of Phalaris arundinacea collected by Paul A. Young at Mandan, North Dakota, July 9. Young reported "The stripe smut usually does not permit the grass to form heads. About 30 per cent of the plants in one large patch were diseased. Since this grass is grown experimentally in preparing it for commercial use in Iowa, the smut threatens to assume economic importance."

SLIME MOLD ON LAWN GRASS IN VIRGINIA: During the past two weeks I received several specimens of lawn grass covered with slime mold. Judging from the appearance of the specimens, it is possible that the organism might be causing some damage by smothering the plants. (S. A. Wingard, July 25).

DISEASES OF TREES

FURTHER REPORTS ON ANTHRACNOSE OF SYCAMORE AND WHITE OAK (GNOMONIA VENETA): A note by August P. Beilmann in the Missouri Botanical Garden Bulletin for June (A serious disease of the sycamore, vol. 23, pp. 95-96. June 1935) states, in part:

> "Not for many years have the sycamores been so seriously defoliated by anthracnose. . . The continued wet weather this spring furnished ideal conditions for its spread. At the present time it has reached epidemic proportions, scarcely an uninfected tree being found within 50 miles of St. Louis. . .

"One of the most striking features of anthracnose this year is its almost complete absence from trees within the range of the St. Louis smoke-pall. Completely defoliated trees cannot be found within several miles of the city limits. This may be due to the efficiency of smoke as a fungicide. Anthracnose makes its appearance with the opening of the buds in spring, at which time the city is still clothed in a smoky mantle. It thus appears that the smoke-begrimed city trees are spared from attack by virtue of their very dirtiness..."

H. A. Edson reported that the disease was much in evidence everywhere along the route from Washington to Hagerstown, Maryland, July 21. It seemed less abundant on the oak than on sycamores. In Virginia, according to S. A. Wingard, sycamore trees have been practically defoliated. R. E. Vaughan reports that anthracnose is widespread on white oak in Wisconsin but is less serious than in many previous years. Specimens have been examined from Dane, Richland, Grant, Walworth, and Milwaukee Counties, and the disease undoubtedly occurs throughout the southern part of the State.

LEAFSPOT ON HORSECHESTNUT: Guignardia aesculi is abundant and often very severe on horsechestnut trees in Westmoreland County, Pennsylvania. (H. A. Edson, July 23). Heavy infection is prevalent in the District of Columbia and vicinity. (J. A. Stevenson, July).

TRUNK ROT OF BLACK LOCUST IN THE DISTRICT OF COLUMBIA: A specimen received from a resident of Washington was determined by J. A. Stevenson as Polyporus robiniophilus (Murr.) Lloyd.

LEAF BLIGHT OF MAGNOLIA IN SOUTH CAROLINA: A fungus on magnolia leaves from Summerville, South Carolina was determined by J. A. Stevenson as Corticium koleroga (Cke) v. Höhn. Only the Rhizoctonia stage was present.

DISEASES OF ORNAMENTAL AND MISCELLANEOUS PLANTS

SOUTHERN BLIGHT ON VARIOUS PLANTS IN TEXAS: At McAllen a large acreage was planted to larkspur principally for cut flowers. In late spring a number of plants were noticed to be wilting in different parts of the field and in a short time nearly 100 per cent of the plants were destroyed. The disease was due to Sclerotium rolfsii.

Also at McAllen, Spanish iris grown for cut flowers and for bulbs on a commercial basis were considerably affected by S. rolfsii. The loss is estimated as over 80 per cent of the plantings.

At Tyler, in June, a number of tung-oil tree (Aleurites fordi) seedlings in the nursery were destroyed by a damping-off which destroyed over 60 per cent of the plants. The cause was determined to be S. rolfsii. (J. J. Taubenhaus and G. E. Altstatt).

DISEASES OF ORNAMENTALS IN VIRGINIA: Powdery mildew has been very common on both rose and lilac. Botrytis blight practically destroyed several lily plantings. Snapdragon rust (Puccinia antirrhini) and hollyhock (P. malvacearum) are unusually destructive at this time. Bacterial blight of delphinium (Bacterium delphinii) has been more common than usual. (S. A. Wingard, July 25).